LASCO/EIT PROCEDURE

FOR REACQUISITION

TO TURN ON POWER,

TEST THE LEB, TELESCOPES

AND

MECHANISMS

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Part I. INTRODUCTION

This document provides the detailed commands and contingencies for the first days of LASCO/EIT instrument operations after the reacquisition of the spacecraft. This document is modified from the initial power on after launch. The status of the instrument is somewhat unknown. The EIT temperature was about 33 C, whereas the COB and LEB temperatures were below -50 C. The EIT door should be open, and the three LASCO doors were closed to the encoder closed position. A problem might have developed anywhere due to the extreme temperatures.

During the first block of LASCO/EIT operations the commanding will be devoted to the initial electronics power on, booting up all processors and verification of proper software functions. Since some problem might have developed in the LEB, the verification of software functions may be a very slow process.

The second block will be devoted to simple peripheral checkouts, followed by detailed EIT checkout. Since the EIT door is opened, checkout of the EIT will be given priority since taking images of the Sun will have significant PR as well as general technical value. Some mechanism and peripheral checkouts might be completed the first day if no problems were encountered.

It is estimated that each block is equivalent to about 4 hours with 4 hours of contingency. Thus the entire sequence will take three days of about 4 hours each day, assuming that no major problems occur.

The commissioning plan is the following:

Block 1
- Verify non-operational temperatures are within operational limits
- Power to LEB, inhibit automatic boot
- Configure relays for normal operations on the A-side
- Check out TCE HK monitors
- Turn experiment power on
- Boot instrument controller board
- Check out ICE HK functions/mechanism status
- Turn on LASCO/EIT zone heaters
- Manually boot OBE
- Check out OBE operation
- Manually boot each camera processor in succession, checking monitors
- Turn PROM card power off
- Take dark image from each camera
- Manually boot FP, check monitors
- Take dark images from each camera

Block 2

- Check out EIT calibration lamp and shutter
- Take a solar EIT image in current filter/sector.
- Checkout EIT camera
- Check out EIT sector wheel
- Take EIT solar images in each sector
- Check out EIT filter wheel
- Check out EIT CCD heaters
- Check out C2 and C3 mechanisms
- Checkout C2 and C3 camera
- Checkout C2 and C3 shutter, filter wheel, polarizer wheel

Block 3

- Checkout C1 mechanism
- Checkout C1 camera
- Checkout Fabry-Perot

Block 4

- Full calibration of EIT telescope

Block 5

- Full door closed calibration of C2 telescope
- Cal lamp images of all filter and polarizer combinations (13 images)
- Repeat

Block 6

- Full door closed calibration of C3 telescope
- Cal lamp images of all filter and polarizer combinations (21 images)
- Repeat
- Image calibration window through all filters and polarizer combinations (21 1/4 field)
- Repeat

Block 7

- Adjust COB legs as necessary
- Open C3 Door
- C3 coronal imaging tests using high wavelet compression, (50x)
- Trim COB pointing as necessary
- C3 coronal imaging tests using normal wavelet compression
- Evaluate image
- Trim COB pointing as necessary
- Dark image checks: 0, 20, 60, 300 seconds
- Exposure time checks in all filter and polarizer combinations (21 images)
- Repeat

- Photon Transfer Curve images through all filters (4 images)
- Ready for normal coronal imaging

Block 8
- Open C2 Door
- C2 alignment tests using ND filter and Lens filter/polarizer combination
- Adjust COB legs as necessary
- Adjust IOCS as necessary
- Dark image checks: 0, 20, 60, 300 seconds
- Exposure time checks in all filter and polarizer combinations (21 images)
- Repeat
- Photon Transfer Curve images through all filters (3 images)
- Ready for C2 coronal imaging

Part II. DETAILED COMMANDS

SECTION 1. PREPARATION FOR LEB TURN ON

OBJECTIVE: Verify that the non-operational temperatures are within operational limits.

1.1	Record the non-op LEB Nominal temperature	DEG _____
1.2	Record the non-op LEB Redundant temperature	DEG _____
1.3	Record the non-op COB Nominal temperature	DEG _____
1.4	Record the non-op COB Redundant temperature	DEG _____
1.5	Record the non-op EIT Nominal temperature	DEG _____
1.6	Record the non-op EIT Redundant temperature	DEG _____
1.7	Plot and print the non-op temperatures	OK _____
1.8	Completion of Section	TIME _____

Contingencies:

C1.1 COB not within 10-30 C
C1.2 LEB over 30 C
C1.3 EIT not within 10-30 C

SECTION 2. ESTABLISH TELEMETRY SESSION WITH ECS

OBJECTIVE: Establish a telemetry between the ECS and the LASCO workstations.

2.1	Start up DACS, DDIS, LADS	OK _____
2.2	Request telemetry distribution from ECS	TIME _____
2.3	Verify that null telemetry is being received	OK _____
2.4	Start up IDL session, running “reformat”	OK _____
2.5	Completion of Section	TIME _____

Contingencies:

C2.1 Telemetry session cannot be established

SECTION 3. SWITCH POWER ON TO THE LEB

OBJECTIVE: Perform the standard procedure to apply power to the LEB, boot the PCE and TCE and then inhibit the automatic boot cycle.

3.1	Execute FOT procedure, l_fl_lebpwron	TIME _____
3.2	Record the time that the LCL command is sent	TIME _____
3.3	Record the S/C measured current at start	AMPS _____
3.4	Record the time HK starts being received	TIME _____
3.5	Record the LASCO current monitor	AMPS _____
3.6	Verify that the Manual Boot command is received	OK _____
3.7	Record the end time of the procedure	TIME _____
3.8	Record the S/C measured current at end	AMPS _____
3.9	Plot the S/C measured current	OK _____
3.10	Completion of Section	TIME _____

Contingencies:

C3.1: Relay indicating A on does not indicate properly
C3.2: After LCL command, current does not increase
C3.3: HK does not appear
C3.4: Manual Boot command not received

SECTION 4. LOBT DISTRIBUTION TO LASCO

OBJECTIVE: Send the ON-BOARD TIME command from the spacecraft on-board software to the LASCO to update the LOBT within the LEB.

4.1	Request LOBT to be distributed to LASCO	OK _____
4.2	Verify that the LOBT command received by LEB on LADS command display	TIME _____
4.3	Record the system time from LADS display	TIME _____
4.4	Record the Spacecraft time from LADS display	TIME _____
4.5	Completion of Section	TIME _____

Contingencies:

C4.1 LOBT command not received

C4.2 Spacecraft time not correct

SECTION 5. ESTABLISH NRT COMMAND SESSION

OBJECTIVE: The checkout of the LASCO/EIT will take place using Near Real-Time commands in which commands are sent out by the LASCO IWS to the ECS, for forwarding to the POCC.

5.1	Record the start time of the session	TIME _____
5.2	Bring up ECS command displays on the X-terminal	OK _____
5.3	Start LOCS on lasco5	OK _____
5.4	Request NRT command session from SOC/ECS operator	OK _____
5.5	Completion of Section	TIME _____

Contingencies:

C5.1: Cannot establish NRT command session

C5.2: NRT command session gets canceled

SECTION 6. CONFIGURE RELAYS FOR A-SIDE

OBJECTIVE: Configure the LEB relays for the normal A-side operation. Probably all of the peripheral relays have been turned off due to the under voltage condition.

6.1	Send PCE Status Request	TIME _____
6.2	Record the status of ICB-A Relay	STATUS _____
6.3	Record the status of ICB-B Relay	STATUS _____
6.4	Record the status of Boresight Relay	STATUS _____
6.5	Record the status of PES Relay	STATUS _____
6.6	Record the status of M1 Relay	STATUS _____
6.7	Record the status of C1 Camera Relay	STATUS _____
6.8	Record the status of C2 Camera Relay	STATUS _____
6.9	Record the status of C3 Camera Relay	STATUS _____
6.10	Record the status of FP Relay	STATUS _____
6.11	Record the status of EIT Camera Relay	STATUS _____
6.12	Record the status of C1 Make-Up Heater Relay	STATUS _____
6.13	Record the status of C2 Make-Up Heater Relay	STATUS _____
6.14	Record the status of C3 Make-Up Heater Relay	STATUS _____
6.15	Record the status of FP Make-Up Heater Relay	STATUS _____
6.16	Record the status of Bias Heater Relay	STATUS _____
6.17	Send command, ICB-A ON, ICB-B OFF	TIME _____
6.18	Wait 30 seconds	OK _____
6.19	Verify ICB-A ON	STATUS _____
6.20	Verify ICB-B OFF	STATUS _____
6.21	Send command, C1 Camera ON	TIME _____
6.22	Wait 30 seconds	OK _____
6.23	Verify C1 ON	STATUS _____
6.24	Send command, C2 Camera ON	TIME _____
6.25	Wait 30 seconds	OK _____
6.26	Verify C2 on	STATUS _____
6.27	Send command, C3 Camera ON	TIME _____
6.28	Wait 30 seconds	OK _____
6.29	Verify C3 on	STATUS _____
6.30	Send command, EIT Camera ON	TIME _____
6.31	Wait 30 seconds	OK _____
6.32	Verify EIT on	STATUS _____
6.33	Send command, FP ON	TIME _____
6.34	Wait 30 seconds	OK _____
6.35	Verify FP on	STATUS _____
6.36	Send command, PES-A ON	TIME _____
6.37	Wait 30 seconds	OK _____
6.38	Verify PES-A ON	STATUS _____

6.39	Send command, M1 OFF	TIME _____
6.40	Wait 30 seconds	OK _____
6.41	Verify M1 OFF	STATUS _____
6.42	Send command, Bias Heater OFF	TIME _____
6.43	Wait 30 seconds	OK _____
6.44	Verify bias heater off	STATUS _____
6.45	Verify C1 MU off	STATUS _____
6.46	Verify C2 MU off	STATUS _____
6.47	Verify C3 MU off	STATUS _____
6.48	Verify FP MU off	STATUS _____
6.49	Completion of Section	TIME _____

Contingencies:

C6.1: Command not received

C6.2: Relay configuration not verified

SECTION 7. SWITCH ON EXPERIMENT POWER

OBJECTIVE: Switch on power to the ICB, and all of the peripherals.

7.1	Send command Experiment Power ON, 31V OFF	TIME _____
7.2	Wait 30 seconds	TIME _____
7.3	Verify Experiment Power ON	TIME _____
7.4	Verify 31V OFF	TIME _____
7.5	Take a snap shot of Voltage-Temperature page	TIME _____
7.6	Record current monitor	AMPS _____
7.7	Completion of Section	TIME _____

Contingencies:

C7.1: Experiment power voltages don't indicate properly

SECTION 8. BOOT UP INSTRUMENT CONTROLLER CARD, A

OBJECTIVE: Boot the ICE software on the ICB-A.

8.1	Send command Select ICB-A	TIME _____
8.2	Send command Reset ICB-A	TIME _____
8.3	Wait 30 seconds	TIME _____
8.4	Verify ICB-A is ON and running boot code	TIME _____
8.5	Send command Boot ICE-A from EEPROM	TIME _____
8.6	Wait 90 seconds	TIME _____
8.7	Verify HK is back and ICE-A is running from EEPROM	TIME _____
8.8	Record current monitor	AMPS _____
8.9	Completion of Section	TIME _____

Contingencies:

C8.1: ICB-A does not reset properly
C8.2: ICB-A does not boot ICE
C8.3: HK does not return after boot

SECTION 9. TURN ON 31 V

OBJECTIVE: Turn on the 31 V power.

9.1	Send command Experiment Power ON, 31V ON	TIME _____
9.2	Wait 30 seconds	TIME _____
9.3	Record value of 31 V	VOLT _____
9.4	Record current monitor	AMPS _____
9.5	Completion of Section	TIME _____

Contingencies:

C9.1: 31 Volts not at nominal value

C9.2: 31 Volt relay does not indicate ON

SECTION 10. FINISH BOOT SEQUENCE OF ICE

OBJECTIVE: The mechanism tables must be initialized and the zone heaters turned off. This is also an opportunity to measure the boresighter status. The zone heaters will automatically come on If boresighter readings not close to sun-pointing, the COB pointing may need to be adjusted using the COB leg actuators.

10.1	Send command Select IC-A	TIME _____
10.2	Send command Side A Select	TIME _____
10.3	Wait until ICE completes (motor table valid)	TIME _____
10.4	Record current monitor	AMPS _____
10.5	Record LASCO Zone Heater 1	VALUE _____
10.6	Record LASCO Zone Heater 2	VALUE _____
10.7	Record LASCO Zone Heater 3	VALUE _____
10.8	Record LASCO Zone Heater 4	VALUE _____
10.9	Record LASCO Zone Heater 5	VALUE _____
10.10	Record EIT Zone Heater 1	VALUE _____
10.11	Record EIT Zone Heater 2	VALUE _____
10.12	Record boresight X-value	VALUE _____
10.13	Record boresight Y-value	VALUE _____
10.14	Take a snapshot of mechanism page	OK _____
10.15	Wait 5 minutes	OK _____
10.16	Verify Zone temperatures increasing slowly	OK _____
10.17	Completion of Section	TIME _____

Contingencies:

C10.1: Side Select doesn't finish
C10.2: Mechanism table values not valid
C10.3: Boresighter values not proper
C10.4: Zone heater value not proper

SECTION 11. BOOT OBE

OBJECTIVE: Send the commands to boot OBE from EEPROM. Verify that pad data is being received in Science Telemetry.

11.1	Send command to boot OBE from EEPROM	TIME _____
11.2	Verify command received by TCE	TIME _____
11.3	Verify HK stops	TIME _____
11.4	Wait about 8 minutes	OK _____
11.5	Verify HK valid	TIME _____
11.6	Send command to perform memory dump of TCB, Scenario File,	TIME _____
11.7	Verify memory dump received on ground	OK _____
11.8	Decode memory dump	OK _____
11.9	Section completed	TIME _____

Contingencies:

C11.1: Boot command not received
C11.2: Boot failure at start
C11.3: OBE fails to boot
C11.4: HK fails to return after boot
C11.5: Science TM not valid
C11.6: Memory dump not valid

SECTION 12. LOBT DISTRIBUTION TO LASCO

OBJECTIVE: Update the local on-board time kept by LASCO in both TCE and OBE. A time correlation needs to be performed to obtain the offsets in time in TCE and also in OBE. The offsets will be different in the two modules.

12.1	Request LOBT to be distributed to LASCO	TIME _____
12.2	Verify that the LOBT command received by LEB on LADS command display	TIME _____
12.3	Record the system time from LADS display	TIME _____
12.4	Record the Spacecraft time from LADS display	TIME _____
12.5	Completion of Section	TIME _____

Contingencies:

C12.1 LOBT command not received

C12.2 Spacecraft time not correct

SECTION 13. BOOT CAMERA AND FP CODE FROM EEPROM TO OBE

OBJECTIVES: Send the commands to boot (transfer) camera and FP code from EEPROM to OBE.

13.1	Send command to boot camera code from EEPROM	TIME	_____
13.2	Verify command received by TCE	TIME	_____
13.3	Verify HK stops	TIME	_____
13.4	Wait about 1.5 minutes	OK	_____
13.5	Verify HK valid	TIME	_____
13.6	Send command to boot FP code from EEPROM	TIME	_____
13.7	Verify command received by TCE	TIME	_____
13.8	Verify HK stops	TIME	_____
13.9	Wait about 1.5 minutes	OK	_____
13.10	Verify HK valid	TIME	_____
13.11	Completion of Section	TIME	_____

Contingencies:

C13.1: Boot command not received

C13.2: Boot failure at start

SECTION 14. TURN OFF PCE POWER

OBJECTIVE: Send the command to turn off power to the PROM card board. When the EEPROMs are not powered, they are not as susceptible to radiation damage.

14.1	Record LASCO current monitor	AMPS _____
14.2	Send command to turn off PCE power	TIME _____
14.3	Verify command received by TCE	TIME _____
14.4	Verify PCE power is off on configuration display	TIME _____
14.5	Record LASCO current monitor	AMPS _____
14.6	Completion of Section	TIME _____

Contingencies:

C14.1: PCE Power off command not received

C14.2: Current does not decrease after PCE power off

SECTION 15. RESET ALL CAMERAS

OBJECTIVE: Send the commands to perform the camera reset on C1, C2, C3, and EIT cameras. This command starts up various internal camera checks. The results of the checks are passed down the HK telemetry channel.

15.1	Record LASCO current monitor	AMPS _____
15.2	Pull down all camera ROM status displays	OK _____
15.3	Send command to reset C1 camera	TIME _____
15.4	Wait 30 seconds	OK _____
15.5	Verify command received by TCE	OK _____
15.6	Verify C1 ROM reset checks all passed	OK _____
15.7	Send command to reset C2 camera	TIME _____
15.8	Wait 30 seconds	OK _____
15.9	Verify command received by TCE	OK _____
15.10	Verify C2 ROM reset checks all passed	OK _____
15.11	Send command to reset C3 camera	TIME _____
15.12	Wait 30 seconds	OK _____
15.13	Verify command received by TCE	OK _____
15.14	Verify C3 ROM reset checks all passed	OK _____
15.15	Send command to reset EIT camera	TIME _____
15.16	Wait 30 seconds	OK _____
15.17	Verify command received by TCE	OK _____
15.18	Verify EIT ROM reset checks all passed	OK _____
15.19	Record LASCO current monitor	AMPS _____
15.20	Remove camera ROM status displays	OK _____
15.21	Completion of Section	TIME _____

Contingencies:

C15.1: Camera reset command does not reset camera

C15.2: Camera does not pass power up tests

SECTION 16. RESET FABRY-PEROT

OBJECTIVE: Perform the peripheral reset of the Fabry-Perot. The FP will start executing out of ROM and will report status in that mode. It is able to operate in a reduced capability in this mode.

16.1	Record LASCO current monitor	AMPS _____
16.2	Start up FP Status Screen Process	OK _____
16.3	Send command to reset FP	TIME _____
16.4	Wait 30 seconds	OK _____
16.5	Verify command received by TCE	OK _____
16.6	Verify FP ROM status all OK.	OK _____
16.7	Record LASCO current monitor	AMPS _____
16.8	Completion of Section	TIME _____

Contingencies:

C16.1: FP reset command does not indicate reset

C16.2: FP status not normal

SECTION 17. LOAD CAMERA CODE TO ALL CAMERAS FROM OBE

OBJECTIVE: Load the camera software from OBE to all cameras. At the completion of the load to each camera, the status request command is sent from OBE to the camera.

17.1	Pull down all camera status displays	OK _____
17.2	Record command sequence counter	VALUE _____
17.3	Send command to boot C1 camera	TIME _____
17.4	Wait 30 seconds	OK _____
17.5	Verify command received by TCE	OK _____
17.6	Verify OBE performing C1 peripheral load	TIME _____
17.7	Wait about 90 seconds	OK _____
17.8	Verify C1 status OK	TIME _____
17.9	Send command to boot C2 camera	TIME _____
17.10	Wait 30 seconds	OK _____
17.11	Verify command received by TCE	OK _____
17.12	Verify OBE performing C2 peripheral load	TIME _____
17.13	Wait about 90 seconds	OK _____
17.14	Verify C2 status OK	TIME _____
17.15	Send command to boot C3 camera	TIME _____
17.16	Wait 30 seconds	OK _____
17.17	Verify command received by TCE	OK _____
17.18	Verify OBE performing C3 peripheral load	TIME _____
17.19	Wait about 90 seconds	OK _____
17.20	Verify C3 status OK	TIME _____
17.21	Send command to boot EIT camera	TIME _____
17.22	Wait 30 seconds	OK _____
17.23	Verify command received by TCE	OK _____
17.24	Verify OBE performing EIT peripheral load	OK _____
17.25	Wait about 90 seconds	OK _____
17.26	Verify EIT status OK	TIME _____
17.27	Record command sequence counter	VALUE _____
17.28	Record LASCO current monitor	AMPS _____
17.29	Completion of Section	TIME _____

Contingencies:

C17.1: Camera errors during code upload

C17.2: Camera status errors after upload

SECTION 18. LOAD FP CODE TO FPE FROM OBE

OBJECTIVE: Bring up the fp_status_screen display. Load FP software from OBE. At the completion of the load, the status request is issued. The FP monitor page will indicate whether the FP control algorithm is controlling.

18.1	On lasco-13, type in xhost +lasco10	OK _____
18.2	From lasco-13, telnet to lasco10 into igse account	OK _____
18.3	Change directory to fp_status	OK _____
18.4	Run the procedure, reader	OK _____
18.5	From lasco-13, telnet to lasco10 into igse account	OK _____
18.6	On lasco10, setenv DISPLAY lasco13:0.0	OK _____
18.7	Change directory to fp_status	OK _____
18.8	Run the procedure, fp_status_screen	OK _____
18.9	Verify FP status screen receiving TM	OK _____
18.10	Send command to boot Fabry-Perot	TIME _____
18.11	Wait 30 seconds	OK _____
18.12	Verify command received by TCE	OK _____
18.13	Verify OBE performing FP peripheral load	TIME _____
18.14	Wait about 8 minutes	OK _____
18.15	Verify FP status OK	TIME _____
18.16	Record OCC Status	TIME _____
	OCC1 _____ OCC2 _____ OCC3 _____	
	Error1_____ Error2_____ Error3_____	
	_____ _____ _____	
18.17	Print FP status page	OK _____
18.18	Record command sequence counter	VALUE _____
18.19	Record LASCO current monitor	AMPS _____
18.20	Completion of Section	TIME _____

Contingencies:

C18.1: FP errors during code upload
C18.2: FP status errors after upload
C18.3. FP is not able to control

SECTION 19. TAKE DARK IMAGE FROM C1, C2, C3, EIT

OBJECTIVE: Perform a dark image sequence from each of the cameras. The primary default parameter table will be loaded with a full image, no sums, port C. The processing table will be loaded with Rice compression, no occulter or ROI table.

19.1	Send scenario file, dptfull.sce	TIME _____
19.2	Send scenario file, riceonly.sce	TIME _____
19.3	Send command to take 0 sec dark image from C1	TIME _____
19.4	Wait for image to finish processing by LEB	OK _____
19.5	Send command to take 60 sec dark image from C1	TIME _____
19.6	Wait for image to finish processing by LEB	OK _____
19.7	Send command to take 0 sec dark image from C2	TIME _____
19.8	Wait for image to finish processing by LEB	OK _____
19.9	Send command to take 60 sec dark image from C2	TIME _____
19.10	Wait for image to finish processing by LEB	OK _____
19.11	Send command to take 0 sec dark image from C3	TIME _____
19.12	Wait for image to finish processing by LEB	OK _____
19.13	Send command to take 60 sec dark image from C3	TIME _____
19.14	Wait for image to finish processing by LEB	OK _____
19.15	Send command to take 0 sec dark image from EIT	TIME _____
19.16	Wait for image to finish processing by LEB	OK _____
19.17	Send command to take 60 sec dark image from EIT	TIME _____
19.18	Generate plot of TAI jumps In IDL: cd,'/net/lasco6/data/packets PLOT_TAI_JUMPS,'yymmdd'	OK _____
19.19	Verify good boot status 19.19.0.0.0.0.0.1 Section completed	OK TIME _____

Contingencies:

C19.1: Dark image LP does not start to execute
C19.2: Dark image LP terminates early, before sending down image
C19.3: Plot of TAI shows jumps in time

SECTION 20. CHECK OUT EIT CALIBRATION LAMP AND SHUTTER

OBJECTIVE: Check out the EIT calibration lamp and shutter to verify their proper functioning prior to taking calibration lamp images.

20.1	Select ICB-A on LOCS mechanism command display	OK _____
20.2	Bring down LADS Voltage-temperature display	OK _____
20.3	Record LASCO current monitor	AMPS _____
20.4	Send command to turn EIT shutter calibration lamp ON	TIME _____
20.5	Wait 30 seconds	OK _____
20.6	Record LASCO current monitor	AMPS _____
20.7	Send command to turn EIT shutter calibration lamp OFF	TIME _____
20.8	Wait 30 seconds	OK _____
20.9	Record LASCO current monitor	AMPS _____
20.10	Record Phase of Shutter	VALUE _____
20.11	Send command to Open EIT Shutter, No LED	TIME _____
20.12	Wait 30 seconds	OK _____
20.13	Verify Shutter Position UNKNOWN	OK _____
20.14	Send command to read EIT shutter position	TIME _____
20.15	Wait 30 seconds	OK _____
20.16	Verify Shutter Position OPEN	OK _____
20.17	Record Phase of Shutter	VALUE _____
20.18	Send command to Close EIT Shutter, No LED	TIME _____
20.19	Wait 30 seconds	OK _____
20.20	Verify Shutter Position UNKNOWN	OK _____
20.21	Send command to read EIT shutter position	TIME _____
20.22	Wait 30 seconds	OK _____
20.23	Verify Shutter Position CLOSED	OK _____
20.24	Record Phase of Shutter	VALUE _____
20.25	Send command to set DPT1 to 1024x1024, 2x2 sum, B, B/S	TIME _____
20.26	Send command to set IP table 19 to Rice	TIME _____
20.27	Send command to set exp table to XX sec	TIME _____
20.28	Send cmd to take normal image, IP19 , DPT1 at current filter wheel and sector wheel positions	TIME _____
20.29	Wait until processing completed	OK _____
20.30	Section complete	TIME _____

Contingencies:

C20.1: Calibration lamp does not increase the current reading.

C20.2: Shutter fails to reach position

SECTION 21. CHECK OUT EIT SECTOR WHEEL MECHANISMS

OBJECTIVE: Check out the EIT sector wheel mechanism, to determine the proper operating characteristics, which may have changed due to the launch vibrations. Vibration might change the amount of preloading on springs in the motors, causing the wheels to oscillate during stepping. Take images at all 4 sector positions.

21.1	Bring down LADS mechanism status display	OK _____
21.2	Send command to move EIT SW to position 0	TIME _____
21.3	Wait 30 seconds	OK _____
21.4	Record encoder position ___ and motor phase ___	OK _____
21.5	Send command to move EIT SW to position 1	TIME _____
21.6	Wait 30 seconds	OK _____
21.7	Record encoder position ___ and motor phase ___	OK _____
21.8	Send command to move EIT SW to position 2	TIME _____
21.9	Wait 30 seconds	OK _____
21.10	Record encoder position ___ and motor phase ___	OK _____
21.11	Send command to move EIT SW to position 3	TIME _____
21.12	Wait 30 seconds	OK _____
21.13	Record encoder position ___ and motor phase ___	OK _____
21.14	Send command to move EIT SW to position 0	TIME _____
21.15	Wait 30 seconds	OK _____
21.16	Record encoder position ___ and motor phase ___	OK _____
21.17	Send command to set DPT1 to 1024x1024, 2x2 sum, B, B/S	TIME _____
21.18	Send command to set IP table 19 to Rice	TIME _____
21.19	Send command to set exp table to XX sec	TIME _____
21.20	Send cmd to take PW Sequence, IP19 , DPT1 at 4 sectors	TIME _____
21.21	Wait until processing completed	OK _____
21.22	Section completed	TIME _____

Contingencies:

C21.1: Sector wheel fails to reach position

C21.2: Take PW Sequence aborts before taking images

C21.3: Image processing aborts before sending image down.

SECTION 22. CHECK OUT EIT FILTER WHEEL MECHANISMS

OBJECTIVE: Check out the EIT filter wheel mechanism, to determine the proper operating characteristics, which may have changed due to the launch vibrations. Vibration might change the amount of preloading on springs in the motors, causing the wheels to oscillate during stepping.

22.1	Bring down LADS mechanism status display	OK _____
22.2	Send command to move EIT FW to position 0	TIME _____
22.3	Wait 30 seconds	OK _____
22.4	Record encoder position ___ and motor phase ___	OK _____
22.5	Send command to move EIT FW to position 1	TIME _____
22.6	Wait 30 seconds	OK _____
22.7	Record encoder position ___ and motor phase ___	OK _____
22.8	Send command to move EIT FW to position 2	TIME _____
22.9	Wait 30 seconds	OK _____
22.10	Record encoder position ___ and motor phase ___	OK _____
22.11	Send command to move EIT FW to position 3	TIME _____
22.12	Wait 30 seconds	OK _____
22.13	Record encoder position ___ and motor phase ___	OK _____
22.14	Send command to move EIT FW to position 4	TIME _____
22.15	Wait 30 seconds	OK _____
22.16	Record encoder position ___ and motor phase ___	OK _____
22.17	Send command to move EIT FW to position 0	TIME _____
22.18	Wait 30 seconds	OK _____
22.19	Record encoder position ___ and motor phase ___	OK _____
22.20	Section completed	TIME _____

Contingencies:

C22.1: Filter wheel fails to reach position

SECTION 23. CHECKOUT EIT CAMERA

OBJECTIVE: Perform the standard checkout of the camera. Take full resolution, 64x1024 images of the underscan region through each readout port to obtain noise estimates. Take a 2x2 sum dark and cal lamp images through all ports. Take a 300 second dark image at full resolution with underscan and overscan pixels.

23.1	Record the command sequence number	VALUE _____
23.2	Send command to set dpt to 64x1024, no sum, A, B/S	TIME _____
23.3	Send command to set IP table 10 to no compression	TIME _____
23.4	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
23.5	Wait until processing completed	OK _____
23.6	Send command to set dpt to 64x1024, no sum, B, B/S	TIME _____
23.7	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
23.8	Wait until processing completed	OK _____
23.9	Send command to set dpt to 64x1024, no sum, C, B/S	TIME _____
23.10	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
23.11	Wait until processing completed	OK _____
23.12	Send command to set dpt to 64x1024, no sum, D, B/S	TIME _____
23.13	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
23.14	Wait until processing completed	OK _____
23.15	Send command to set dpt to 1024x1024, 2x2 sum, B, B/S	TIME _____
23.16	Send command to set IP table 19 to Rice	TIME _____
23.17	Send command to set exp table to 10 sec	TIME _____
23.18	Send cmd to take cal lamp image, IP19 , DPT1 ,fw0, sw0	TIME _____
23.19	Wait until processing completed	OK _____
23.20	Send command to take 10 sec dark image, IP19, DPT1	TIME _____
23.21	Wait until processing completed	OK _____
23.22	Send command to take 300 sec dark image, IP19, DPT1	TIME _____
23.23	Record the command sequence number	VALUE _____
23.24	Section completed	TIME _____

Contingencies:

C23.1: Dark image LP aborts before sending image down.

C23.2: Cal lamp image LP aborts before sending image down.

C23.3: Exposure time for cal lamp not correct.

SECTION 24. CHECKOUT EIT CAMERA HEATERS

OBJECTIVE: Checkout both the high and low wattage EIT camera heaters and then turn the high wattage heater on.

24.1	Record the LEB current monitor	AMPS _____
24.2	Record the EIT camera temperature	DEG _____
24.3	Record the EIT cold finger temperature	VOLTS _____
24.4	Send command to set high wattage heater ON	TIME _____
24.5	Wait 120 seconds	OK _____
24.6	Record the LEB current monitor	AMPS _____
24.7	Record the EIT camera temperature	DEG _____
24.8	Record the EIT cold finger temperature	VOLTS _____
24.9	Send command to set high wattage heater OFF	TIME _____
24.10	Record the LEB current monitor	AMPS _____
24.11	Send command to set low wattage heater to value 90	TIME _____
24.12	Wait 120 seconds	OK _____
24.13	Record the LEB current monitor	AMPS _____
24.14	Record the EIT camera temperature	DEG _____
24.15	Record the EIT cold finger temperature	VOLTS _____
24.16	Send command to set low wattage heater to value 255	TIME _____
24.17	Send command to set high wattage heater ON	TIME _____
24.18	Wait 30 seconds	OK _____
24.19	Record the LEB current monitor	AMPS _____
24.20	Record the EIT camera temperature	DEG _____
24.21	Record the EIT cold finger temperature	VOLTS _____
24.22	Section completed	TIME _____

Contingencies:

C24.1: Low wattage heater fails to increase current
C24.2: High wattage heater fails to increase current
C24.3: Low wattage heater fails to turn off
C24.4: High wattage heater fails to turn off

SECTION 25. CHECK OUT C1, C2 AND C3 CALIBRATION LAMPS

OBJECTIVE: Check out the C1, C2 and C3 calibration lamps to verify their proper functioning prior to taking calibration lamp images.

25.1	Select ICB-A on LOCS mechanism command display	OK _____
25.2	Bring down LADS Voltage-temperature display	OK _____
25.3	Record LASCO current monitor	AMPS _____
25.4	Send command to turn C1 door calibration lamp ON	TIME _____
25.5	Wait 30 seconds	OK _____
25.6	Record LASCO current monitor	AMPS _____
25.7	Send command to turn C1 door calibration lamp OFF	TIME _____
25.8	Wait 30 seconds	OK _____
25.9	Record LASCO current monitor	AMPS _____
25.10	Send command to turn C2 door calibration lamp ON	TIME _____
25.11	Wait 30 seconds	OK _____
25.12	Record LASCO current monitor	AMPS _____
25.13	Send command to turn C2 door calibration lamp OFF	TIME _____
25.14	Wait 30 seconds	OK _____
25.15	Record LASCO current monitor	AMPS _____
25.16	Send command to turn C2 shutter calibration lamp ON	TIME _____
25.17	Wait 30 seconds	OK _____
25.18	Record LASCO current monitor	AMPS _____
25.19	Send command to turn C2 shutter calibration lamp OFF	TIME _____
25.20	Wait 30 seconds	OK _____
25.21	Record LASCO current monitor	AMPS _____
25.22	Send command to turn C3 shutter calibration lamp ON	TIME _____
25.23	Wait 30 seconds	OK _____
25.24	Record LASCO current monitor	AMPS _____
25.25	Send command to turn C3 shutter calibration lamp OFF	TIME _____
25.26	Wait 30 seconds	OK _____
25.27	Record LASCO current monitor	AMPS _____
25.28	Section complete	TIME _____

Contingencies:

C25.1: Calibration lamp does not increase the current reading.

SECTION 26. CHECK OUT C1, C2 AND C3 SHUTTERS

OBJECTIVE: Check out the C1, C2 and C3 shutters to verify their proper functioning prior to taking calibration lamp images.

26.1	Record Phase of C1 Shutter	VALUE _____
26.2	Send command to Open C1 Shutter, No LED	TIME _____
26.3	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.4	Send command to read C1 shutter position	TIME _____
26.5	Wait 30 seconds, Verify Shutter Position OPEN	OK _____
26.6	Record Phase of C1 Shutter	VALUE _____
26.7	Send command to Close C1 Shutter, No LED	TIME _____
26.8	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.9	Send command to read C1 shutter position	TIME _____
26.10	Wait 30 seconds, Verify Shutter Position CLOSED	OK _____
26.11	Record Phase of C1 Shutter	VALUE _____
26.12	Record Phase of C2 Shutter	VALUE _____
26.13	Send command to Open C2 Shutter, No LED	TIME _____
26.14	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.15	Send command to read C2 shutter position	TIME _____
26.16	Wait 30 seconds, Verify Shutter Position OPEN	OK _____
26.17	Record Phase of C2 Shutter	VALUE _____
26.18	Send command to Close C2 Shutter, No LED	TIME _____
26.19	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.20	Send command to read C2 shutter position	TIME _____
26.21	Wait 30 seconds, Verify Shutter Position CLOSED	OK _____
26.22	Record Phase of C2 Shutter	VALUE _____
26.23	Record Phase of C3 Shutter	VALUE _____
26.24	Send command to Open C3 Shutter, No LED	TIME _____
26.25	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.26	Send command to read C3 shutter position	TIME _____
26.27	Wait 30 seconds, Verify Shutter Position OPEN	OK _____
26.28	Record Phase of C3 Shutter	VALUE _____
26.29	Send command to Close C3 Shutter, No LED	TIME _____
26.30	Wait 30 seconds, Verify Shutter Position UNKNOWN	OK _____
26.31	Send command to read C3 shutter position	TIME _____
26.32	Wait 30 seconds, Verify Shutter Position CLOSED	OK _____
26.33	Record Phase of C3 Shutter	VALUE _____
26.34	Section complete	TIME _____

Contingencies:

C26.1: Shutter fails to reach position

SECTION 27. CHECK OUT C2 WHEEL MECHANISMS

OBJECTIVE: Check out the C2 wheel mechanisms, to determine the proper operating characteristics, which may have changed due to the launch vibrations. Vibration might change the amount of preloading on springs in the motors, causing the wheels to oscillate during stepping.

27.1	Bring down LADS mechanism status display	OK _____
27.2	Send command to move C2 FW to position 0	TIME _____
27.3	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.4	Send command to move C2 FW to position 1	TIME _____
27.5	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.6	Send command to move C2 FW to position 2	TIME _____
27.7	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.8	Send command to move C2 FW to position 3	TIME _____
27.9	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.10	Send command to move C2 FW to position 4	TIME _____
27.11	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.12	Send command to move C2 FW to position 0	TIME _____
27.13	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.14	Send command to move C2 PW to position 0	TIME _____
27.15	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.16	Send command to move C2 PW to position 1	TIME _____
27.17	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.18	Send command to move C2 PW to position 2	TIME _____
27.19	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.20	Send command to move C2 PW to position 3	TIME _____
27.21	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.22	Send command to move C2 PW to position 4	TIME _____
27.23	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.24	Send command to move C2 PW to position 0	TIME _____
27.25	Wait 30 sec, Record encoder position ___ and motor phase ___	
27.26	Section completed	TIME _____

Contingencies:

C27.1: Filter or polarizer wheel fails to reach position

SECTION 28. CHECK OUT C3 WHEEL MECHANISMS

OBJECTIVE: Check out the C3 wheel mechanisms, to determine the proper operating characteristics, which may have changed due to the launch vibrations. Vibration might change the amount of preloading on springs in the motors, causing the wheels to oscillate during stepping.

28.1	Bring down LADS mechanism status display	OK _____
28.2	Send command to move C3 FW to position 0	TIME _____
28.3	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.4	Send command to move C3 FW to position 1	TIME _____
28.5	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.6	Send command to move C3 FW to position 2	TIME _____
28.7	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.8	Send command to move C3 FW to position 3	TIME _____
28.9	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.10	Send command to move C3 FW to position 4	TIME _____
28.11	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.12	Send command to move C3 FW to position 0	TIME _____
28.13	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.14	Send command to move C3 PW to position 0	TIME _____
28.15	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.16	Send command to move C3 PW to position 1	TIME _____
28.17	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.18	Send command to move C3 PW to position 2	TIME _____
28.19	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.20	Send command to move C3 PW to position 3	TIME _____
28.21	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.22	Send command to move C3 PW to position 4	TIME _____
28.23	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.24	Send command to move C3 PW to position 0	TIME _____
28.25	Wait 30 sec, Record encoder position ___ and motor phase ___	
28.26	Section completed	TIME _____

Contingencies:

C28.1: Filter or polarizer wheel fails to reach position

SECTION 29. CHECKOUT C2 CAMERA

OBJECTIVE: Perform the standard checkout of the C2 camera. Take full resolution, 64x1024 images of the underscan region through each readout port to obtain noise estimates. Take a 2x2 sum dark and cal lamp images through port C at the orange filter. Take a 300 second full resolution dark image with underscan and overscan pixels. Exposure times may need to be adjusted.

29.1	Record the command sequence number	VALUE _____
29.2	Send command to set dpt to 64x1024, no sum, A	TIME _____
29.3	Send command to set IP table 10 to no compression	TIME _____
29.4	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
29.5	Wait until processing completed	OK _____
29.6	Send command to set dpt to 64x1024, no sum, B	TIME _____
29.7	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
29.8	Wait until processing completed	OK _____
29.9	Send command to set dpt to 64x1024, no sum, C	TIME _____
29.10	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
29.11	Wait until processing completed	OK _____
29.12	Send command to set dpt to 64x1024, no sum, D	TIME _____
29.13	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
29.14	Wait until processing completed	OK _____
29.15	Send command to set dpt to 1024x1024, 2x2 sum, C	TIME _____
29.16	Send command to set IP table 19 to Rice	TIME _____
29.17	Send command to set exp table to 10 sec	TIME _____
29.18	Send cmd to take cal lamp image, IP19 , DPT1 ,fw3, pw0	TIME _____
29.19	Wait until processing completed	OK _____
29.20	Send command to take 10 sec dark image, IP19, DPT1	TIME _____
29.21	Wait until processing completed	OK _____
29.22	Send command to take 300 sec dark image, IP19, DPT1	TIME _____
29.23	Record the command sequence number	VALUE _____
29.24	Section completed	TIME _____

Contingencies:

C29.1: Dark image LP aborts before sending image down.

C29.2: Cal lamp image LP aborts before sending image down.

C29.3: Exposure time for cal lamp not correct.

SECTION 30. CHECKOUT C3 CAMERA

OBJECTIVE: Perform the standard checkout of the C3 camera. Take full resolution, 64x1024 images of the underscan region through each readout port to obtain noise estimates. Take a 2x2 sum dark and cal lamp images through all ports through the clear filter. Take a 300 second full resolution dark image with underscan and overscan pixels. Exposure times may need to be adjusted.

30.1	Record the command sequence number	VALUE _____
30.2	Send command to set dpt to 64x1024, no sum, A	TIME _____
30.3	Send command to set IP table 10 to no compression	TIME _____
30.4	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
30.5	Wait until processing completed	OK _____
30.6	Send command to set dpt to 64x1024, no sum, B	TIME _____
30.7	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
30.8	Wait until processing completed	OK _____
30.9	Send command to set dpt to 64x1024, no sum, C	TIME _____
30.10	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
30.11	Wait until processing completed	OK _____
30.12	Send command to set dpt to 64x1024, no sum, D	TIME _____
30.13	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
30.14	Wait until processing completed	OK _____
30.15	Send command to set dpt to 1024x1024, 2x2 sum, C	TIME _____
30.16	Send command to set IP table 19 to Rice	TIME _____
30.17	Send command to set exp table to 20 sec	TIME _____
30.18	Send cmd to take cal lamp image, IP19 , DPT1 ,fw0, pw0	TIME _____
30.19	Wait until processing completed	OK _____
30.20	Send command to take 20 sec dark image, IP19, DPT1	TIME _____
30.21	Wait until processing completed	OK _____
30.22	Send command to take 300 sec dark image, IP19, DPT1	TIME _____
30.23	Record the command sequence number	VALUE _____
30.24	Section completed	TIME _____

Contingencies:

C30.1: Dark image LP aborts before sending image down.

C30.2: Cal lamp image LP aborts before sending image down.

C30.3: Exposure time for cal lamp not correct.

SECTION 31. CHECK OUT C1 MECHANISMS

OBJECTIVE: Check out the C1 wheel mechanisms, to determine the proper operating characteristics, which may have changed due to the launch vibrations. The amount of preloading on springs in the motors may have changed, causing the wheels to oscillate during stepping.

31.1	Bring down LADS mechanism status display	OK _____
31.2	Send command to move C1 FW to position 0	TIME _____
31.3	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.4	Send command to move C1 FW to position 1	TIME _____
31.5	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.6	Send command to move C1 FW to position 2	TIME _____
31.7	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.8	Send command to move C1 FW to position 3	TIME _____
31.9	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.10	Send command to move C1 FW to position 4	TIME _____
31.11	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.12	Send command to move C1 FW to position 0	TIME _____
31.13	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.14	Send command to move C1 PW to position 0	TIME _____
31.15	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.16	Send command to move C1 PW to position 1	TIME _____
31.17	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.18	Send command to move C1 PW to position 2	TIME _____
31.19	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.20	Send command to move C1 PW to position 3	TIME _____
31.21	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.22	Send command to move C1 PW to position 4	TIME _____
31.23	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.24	Send command to move C1 PW to position 0	TIME _____
31.25	Wait 30 sec, Record encoder position ___ and motor phase ___	
31.26	Section completed	TIME _____

Contingencies:

C31.1: Filter or polarizer wheel fails to reach position

SECTION 32. CHECKOUT C1 CAMERA

OBJECTIVE: Perform the standard checkout of the C1 camera. FP is set to 5303 wavelength. Take full resolution, 64x1024 images of the underscan region through each readout port to obtain noise estimates. Take a 2x2 sum dark and cal lamp images through prime port through the orange filter. Take a 300 second full resolution dark image with underscan and overscan pixels. Exposure times may need to be adjusted. Take a normal exposure without the cal lamp at the same exposure time as the cal lamp.

32.1	Record the command sequence number	VALUE _____
32.2	Send command to set dpt to 64x1024, no sum, A	TIME _____
32.3	Send command to set IP table 10 to no compression	TIME _____
32.4	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
32.5	Wait until processing completed	OK _____
32.6	Send command to set dpt to 64x1024, no sum, B	TIME _____
32.7	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
32.8	Wait until processing completed	OK _____
32.9	Send command to set dpt to 64x1024, no sum, C	TIME _____
32.10	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
32.11	Wait until processing completed	OK _____
32.12	Send command to set dpt to 64x1024, no sum, D	TIME _____
32.13	Send command to take 0 sec dark image, IP10, DPT1	TIME _____
32.14	Wait until processing completed	OK _____
32.15	Send command to set dpt to 1024x1024, 2x2 sum, C	TIME _____
32.16	Send command to set IP table 19 to Rice	TIME _____
32.17	Send command to set exp table to 10 sec	TIME _____
32.18	Send command to set FP wavelength to 5303	TIME _____
32.19	Send cmd to take cal lamp image, IP19 , DPT1 ,fw4, pw0	TIME _____
32.20	Wait until processing completed	OK _____
32.21	Send cmd to take normal image, IP19 , DPT1 ,fw4, pw0	TIME _____
32.22	Wait until processing completed	OK _____
32.23	Send command to take 0 sec dark image, IP19, DPT1	TIME _____
32.24	Wait until processing completed	OK _____
32.25	Evaluate cal lamp image to determine brightness level	TIME _____
32.26	Send command to take 300 sec dark image, IP19, DPT1	TIME _____
32.27	Record the command sequence number	VALUE _____
32.28	Section completed	TIME _____

Contingencies:

C32.1: Dark image LP aborts before sending image down.
C32.2: Cal lamp image LP aborts before sending image down.
C32.3: Exposure time for cal lamp not correct.

SECTION 33. CHECKOUT FABRY-PEROT

OBJECTIVE: Perform a preliminary checkout of the Fabry-Perot.

33.1 See separate document.

SECTION 34. ADJUST POINTING OF COB TO SUN CENTER (OPTIONAL)

OBJECTIVE: This is optional at this time. The pointing of the COB may be improved by commanding the legs to move. Since the doors are not to be opened, the pointing adjustment is only for thermal considerations.

34.1	Record boresight X-value	VALUE _____
34.2	Record boresight Y-value	VALUE _____
34.3	Generate a plot of plot of BS and PES values: In IDL: hk=READALLHK('yymmdd') PLOT_BS_PES,hk	OK _____
34.4	Determine number of steps to send to Leg 1 Number = _____ Direction = _____	OK _____
34.5	Determine number of steps to send to Leg 2 Number = _____ Direction = _____	OK _____
34.6	Set up Leg #1 steps and direction in command	OK _____
34.7	Send Command to move Leg #1	TIME _____
34.8	Wait 30 seconds	OK _____
34.9	Record boresight X-value	VALUE _____
34.10	Record boresight Y-value	VALUE _____
34.11	Set up Leg #2 steps and direction in command	OK _____
34.12	Send Command to move Leg #2	TIME _____
34.13	Wait 30 seconds	OK _____
34.14	Record boresight X-value	VALUE _____
34.15	Record boresight Y-value	VALUE _____
34.16	Repeat command if desired	OK _____
34.17	Completion of Section	TIME _____

Contingencies:

C34.1 Boresighter encoder does not indicate zero after leg motion

C34.1 Boresighter encoder indicates the same after leg motion

SECTION 35. TURN OFF EXPERIMENT POWER AND 31V (OPTIONAL)

OBJECTIVE: Send the commands to turn off experiment power and 31 V to get set to change the instrument configuration relays.

35.1	Record the temperature of the LEB Power converter	DEG _____
35.2	Record the temperature of the LEB Non-Op Thermistor A	DEG _____
35.3	Record the temperature of the LEB Non-Op Thermistor B	DEG _____
35.4	Send Command Exp Power OFF and 31 V ON	TIME _____
35.5	Wait 30 seconds	OK _____
35.6	Verify Experiment Power OFF	TIME _____
35.7	Send Command Exp Power OFF and 31 V OFF	TIME _____
35.8	Wait 30 seconds	OK _____
35.9	Verify Experiment Power OFF	TIME _____
35.10	Verify 31 V OFF	TIME _____
35.11	Completion of Section	TIME _____

Contingencies:

C35.1: Experiment power doesn't turn off

C35.2: 31 V power doesn't turn off

SECTION 36. BOOT ICE-A (OPTIONAL)

OBJECTIVE: Send the commands to boot ICE code on instrument controller A.

36.1	Send command Select IC-A	TIME _____
36.2	Send command Reset IC-A	TIME _____
36.3	Wait 30 seconds	TIME _____
36.4	Verify IC-A is ON and running boot code	TIME _____
36.5	Send command Boot ICE-A from EEPROM	TIME _____
36.6	Wait 90 seconds	TIME _____
36.7	Verify HK is valid	TIME _____
36.8	Verify ICE-A is running from EEPROM	TIME _____
36.9	Record current monitor	AMPS _____
36.10	Completion of Section	TIME _____

Contingencies:

C36.1: ICB-A does not reset properly
C36.2: ICB-A does not boot ICE
C36.3: HK does not return after boot

SECTION 37. TURN ON 31 V (OPTIONAL)

OBJECTIVE: Send the command to turn the 31 V power on to power the encoders, motor coils and heaters as necessary.

37.1	Send command Experiment Power ON, 31V ON	TIME _____
37.2	Wait 30 seconds	TIME _____
37.3	Record value of 31 V	VOLT _____
37.4	Record current monitor	AMPS _____
37.5	Completion of Section	TIME _____

Contingencies:

C37.1: 31 Volts not at nominal value

C37.2: 31 Volt relay does not indicate ON

SECTION 38. FINISH BOOT SEQUENCE OF ICE (OPTIONAL)

OBJECTIVE: Now that 31 V is on, we may complete the boot sequence of ICE, by sending the commands to set the mechanism driver table and to turn off the zone heaters. At the completion of this section, ICE is ready for normal operations. The motors will still need to be tested to determine the proper operating parameters.

38.1	Send command Select IC-A	TIME _____
38.2	Send command Side A Select	TIME _____
38.3	Wait until ICE completes (motor table valid)	TIME _____
38.4	Record current monitor	AMPS _____
38.5	Send scenario file, zonesoff_a.sce	TIME _____
38.6	Wait 30 seconds	TIME _____
38.7	Record current monitor	AMPS _____
38.8	Completion of Section	TIME _____

Contingencies:

C38.1: Side Select doesn't finish
C38.2: Mechanism table values not valid
C38.3: Boresighter values not proper

SECTION 39. BIAS HEATERS ON (OPTIONAL)

OBJECTIVE: If the temperature of the COB is not high enough, then additional heater power will be applied to raise the temperature.

39.1	Record the COB temperature (Nominal)	DEG _____
39.2	Record the COB temperature (Redundant)	DEG _____
39.3	If a COB temperature is < 15 C then	
39.3.1	Send command, 31V OFF	TIME _____
39.3.2	Wait 30 seconds	OK _____
39.3.3	Verify 31V OFF	STATUS _____
39.3.4	Send command, Experiment Power OFF	TIME _____
39.3.5	Wait 30 seconds	OK _____
39.3.6	Verify Experiment Power OFF	STATUS _____
39.3.7	Send command, Bias Heater Relay ON	TIME _____
39.3.8	Wait 30 seconds	OK _____
39.3.9	Verify bias heater ON	STATUS _____
39.3.10	Send RCR command to cycle instrument power	TIME _____
39.3.11	Autoboot started	TIME _____
39.3.12	Autoboot completed	TIME _____
39.4	Completion of Section	TIME _____

Contingencies:

C7.1: Bias heater doesn't indicate ON

PART III. CONTINGENCIES

C1.1: COB not within 10-30 C

1. Raise non-operational heater power to COB

C1.2: LEB over 30 C

1. Be careful in bringing up power!!! May need to turn peripherals off in order to keep temperature of PC low enough.

C1.3: EIT not within 10-30 C

1. Raise non-operational heater power to EIT

C2.1: Telemetry session cannot be established

1. Use a different workstation.
2. If the problem is with ECS then abort until TM session can be established.

C3.1: Relay indicating LEB-A on does not indicate properly

1. Retry the command, using redundant command unit
2. If still not indicating properly, proceed with LCL turn on, to see if problem is with the encoder.

C3.2: After LCL command, current does not increase

1. If relay not indicating properly then must be the primary/redundant LEB relay sticking
2. Switch to redundant LEB?

C3.3: HK does not appear

1. Reboot by cycling power using LCL relay

C3.4: Manual Boot command not received

1. Determine if command is lost, received by LEB with no toggle bit error or received by LEB with a toggle bit error.
2. If command was lost, shut off power using LCL and retry the TSTOL procedure
3. If command was received without toggle bit error, then do the same as #2.
4. If the command was received with toggle bit error, let autoboot after another power cycling.

C4.1: LOBT command not received

1. Determine if command is lost, received by LEB with no toggle bit error or received by LEB with a toggle bit error.
2. If command was lost, then send the same command again.
3. If command did not create toggle bit error, and no error reported by LEB, then send the same command again.

4. If command did create toggle bit error, determine error as reported by LEB, then send the same command again.

C4.2: Spacecraft time not correct

1. Not critical.

C5.1: Cannot establish NRT command session

1. If the problem is with the LASCO IWS, use a different work station.
2. If the problem is with the ECS, then abort procedure until the problem is corrected.

C5.2: NRT command session gets canceled

1. Change environment variable, ???, to new number.
2. Restart the session.
3. Change command sequence number to last number.

C6.1: All commands not received after sending scenario file, icbabon.sce

1. Determine command problem: lost, received no error, received with error
2. Resend entire scenario file

C6.2: Relay configuration not verified

1. Determine if a command problem
2. Send command again.

C7.1: Experiment power doesn't indicate properly

1. Shut off experiment power and diagnose problem
2. If experiment power doesn’t respond then shut off main power by LCL

C8.1: ICB-A does not reset properly

1. Verify that the commands were received by LEB correctly
2. Send command: ICA-select
3. Send command: ICA-reset

C8.2: ICB-A does not boot ICE

1. Reset ICB-A
2. Boot ICE-A from bipolar

C8.3: HK does not return after boot

1. Reboot by cycling power using LCL relay
2. When HK appears, reboot TCE using different source (ie EEPROM)
3. If this still doesn’t work, repeat, but reboot with different PCE source

C9.1: 31 Volts not at nominal value

1. Determine spacecraft bus voltage.

2. If 1 volt less than spacecraft buss voltage, then proceed

C9.2: 31 Volt relay does not indicate ON

1. If no command error, then TCE must be busy doing something. This is a software monitor.

C10.1: Side Select doesn't finish

1. If TCE is reporting that it is not communicating with ICE, then send the command to reset ICE-A. TCE might hold this command because it is still waiting for ICE. After a timeout period, TCE might execute the command.
2. Another possibility is to turn 31V and Expt Pwr off. But TCE might hold these commands also.

C10.2: Mechanism table values not valid

1. Is 31V on? If not send the command to put it on and repeat the side select command.
2. If some values are valid and others not, then the mechanism might not be on an encoder position. Send the commands to put the questioned mechanisms into a valid position.

C10.3: Boresighter values not proper

1. Determine if the pointing of the spacecraft is OK.
2. If OK, then the COB must be off pointed. Move the legs to put the COB in a sun-pointing direction.

C10.4: Zone heater not controlling

1. Verify +31V on
2. Is set point close to actual values?
3. Send discrete command to turn zone on to set point

C11.1: Boot command not received

1. Determine if command problem
2. Determine if HK was being received at the time of the command. TCE may have been rebooting something and would not have acknowledged the command.
3. Resend the boot command.

C11.2: Boot failure at start

1. Verify that PROM card power is up. If not send PROM card power on and resend the boot command.
2. Bad checksum. Boot from different source. This should not happen since we are booting OBE from bipolar, which doesn't check the checksum.

C11.3: OBE fails to boot

1. Cycle power and start over using a different source for OBE.

C11.4: HK fails to return after boot

1. Cycle power and start over using a different source for OBE.

C11.5: Science TM not valid

4. Cycle power to LEB
5. Inhibit autoboot
6. Boot ICE-A from EEPROM
7. Boot OBE from Bipolar
8. If Science TM still not valid, then go to B-Side

C11.6: Memory dump not valid

1. Reload OBE EEPROM from the ground
2. Cycle power to LEB
3. Inhibit autoboot
4. Boot ICE-A from EEPROM
5. Boot OBE from Bipolar
6. If Science TM still not valid, then go to B-Side

C12.1 LOBT command not received

1. Determine if command is lost, received by LEB with no toggle bit error or received by LEB with a toggle bit error.
2. If command was lost, then send the same command again.
3. If command did not create toggle bit error, and no error reported by LEB, then send the same command again.
4. If command did create toggle bit error, determine error as reported by LEB, then send the same command again.

C12.2 Spacecraft time not correct

1. Software error

C13.1: Boot command not received

1. Resend command

C13.2: Boot failure at start

1. Reload code from the ground into EEPROM

C14.1: PCE Power off command not received

C14.2: Current does not decrease after PCE power off

1. Verify that PCE configuration status indicates that power is off
2. Turn PCE power back on
3. Verify that PCE configuration status is on
4. Send PCE status request

5. Turn PCE power off
6. Verify PCE configuration status and current level

C15.1: Camera reset command does not reset camera
1. Verify camera ROM status page is pulled down.
2. Send reset command again.

C15.2: Camera does not pass power up tests
1. Send reset command again
2. Try to boot anyway, but may fail.

C16.1: FP reset command does not indicate reset
1. Verify FP status page is open.
2. Send the reset command again.

C16.2: FP status not normal

C17.1: Camera errors during code upload
1. Is the COB/LEB too hot?
2. Reset the camera
3. Resend the code upload.

C17.2: Camera status errors after upload
1. Reset the camera
2. Resend the code upload

C18.1: FP errors during code upload
1. Reset the camera
2. Resend the code upload

C18.2: FP status errors after upload
1. Reset the camera
2. Resend the code upload

C18.3. FP OCC is not able to control

C19.1: Dark image LP does not start to execute
1. Did the OBE alerts indicate that Operator was scheduled a task?
2. If not then resend command

C19.2: Dark image LP terminates early, before sending down image
1. Determine failure code.

C19.3: Plot of TAI shows jumps in time

1. Cycle power to LEB
2. Let system autoboot
3. Replot TAI to verify good boot

C20.1: Calibration lamp does not increase the current reading.

1. Is 31V on?

C20.2: Shutter fails to reach position

1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C21.1: Sector wheel fails to reach position

1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C21.2: Take PW Sequence fails to work properly

1. Determine failure code

C21.3: Image processing aborts before sending image down.

1. Determine failure code

C22.1: Filter wheel fails to reach position

1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C23.1: Dark image LP aborts before sending image down.

1. Determine failure code

C23.2: Cal lamp image LP aborts before sending image down.

1. Determine failure code

C23.3: Exposure time for cal lamp not correct.

1. Increase or decrease exposure times in the table
2. Upload the exposure time table
3. Reschedule the image

C24.1: Low wattage heater fails to increase current

1. Verify set point
2. Resend command with set point at 0

C24.2: High wattage heater fails to increase current
1. TBD

C24.3: Low wattage heater fails to turn off
1. Verify set point
2. Resend command with set point at 255

C24.4: High wattage heater fails to turn off

C25.1: Calibration lamp does not increase the current reading.
1. Is 31V on?

C26.1: Shutter fails to reach position
1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C27.1: Filter or polarizer wheel fails to reach position
1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C28.1: Filter or polarizer wheel fails to reach position
1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C29.1: Dark image LP aborts before sending image down.
1. Determine failure code

C29.2: Cal lamp image LP aborts before sending image down.
1. Determine failure code

C29.3: Exposure time for cal lamp not correct.
1. Increase or decrease exposure times in the table
2. Upload the exposure time table
3. Reschedule the image

C30.1: Dark image LP aborts before sending image down.
1. Determine failure code

C30.2: Cal lamp image LP aborts before sending image down.
1. Determine failure code

C30.3: Exposure time for cal lamp not correct.

1. Increase or decrease exposure times in the table
2. Upload the exposure time table
3. Reschedule the image

C31.1: Filter or polarizer wheel fails to reach position

1. Perform mechanism checkout to determine better mechanism parameters
2. Set mechanism to desired position.
3. Modify ICE and upload new version

C32.1: Dark image LP aborts before sending image down.

1. Determine failure code

C32.2: Cal lamp image LP aborts before sending image down.

1. Determine failure code

C32.3: Exposure time for cal lamp not correct.

1. Increase or decrease exposure times in the table
2. Upload the exposure time table
3. Reschedule the image

C34.1 Boresighter encoder does not indicate zero after leg motion

1. Recompute amounts to drive and send the commands again.

C34.1 Boresighter encoder indicates the same after leg motion

1. Was the time of driving greater than 15 seconds? If so, check the current to see if the current increased during the driving time.
2. Did the encoder change?
3. Switch to ICE-B?

C35.1: Experiment power doesn't turn off

1. Send LEB power off through LCL relays and reboot.

C35.2: 31 V power doesn't turn off

1. Send LEB power off through LCL relays and reboot.

C36.1: ICB-A does not reset properly

1. Send Select ICB-A
2. Resend the ICB-A reset command

C36.2: ICB-A does not boot ICE

1. Resend Select ICB-A
2. Resend the ICB-A reset command

3. Verify that ICB-A is reset
4. Resend the boot ICB-A (perhaps from bipolar)

C36.3: HK does not return after boot

1. Send reboot of TCE
2. If that is successful then bring up ICB-A again.
3. Indicate to TCE that OBE is up.
4. If unsuccessful then cycle power to LEB and start over.

C37.1: 31 Volts not at nominal value

1. Determine spacecraft bus voltage.
2. If 1 volt less than spacecraft buss voltage, then proceed

C37.2: 31 Volt relay does not indicate ON

1. If no command error, then TCE must be busy doing something. This is a software monitor so if 31V monitor is OK then a software problem.

C38.1: Side Select doesn't finish

1. Reset ICE-A
2. Reboot ICE-A

C38.2: Mechanism table values not valid

1. Is 31V on?

C38.3: Boresighter values not proper

1. Were they proper earlier?
2. If so, has the S/C moved slightly?

C39.1: Bias heater doesn't indicate ON

1. Determine if a command problem
2. Send command again and check.
3. Proceed if still doesn’t respond.

PART IV. SCENARIO FILES

zonesoff.sce	Turns the zones heaters off.
dptfull.sce	Sets up all the camera parameter tables to full readout, no summing, 10 fast clears, heaters off, readout port A
riceonly.sce	Sets up Image Processing table #19 to do Rice compression only, (ie. do not use the occulter table nor the ROI table)
nocomp.sce	Sets up Image Processing table #10 to perform no blocking and no compression.
redcap.sce	Puts the FPE into reduced capability mode (manual control of PZT)
zeropzt.sce	Puts the FP PZT voltages to zero
fullcap.sce	Puts the FPE to full capability mode (controlling PZT)